CLAIMS

1. Method for controlling a direct-injection gasoline engine during regeneration of a lean NOx trap disposed in an exhaust path of the engine, the regeneration characterized by a transition from lean stratified engine operation to rich homogeneous engine operation, comprising:

upon initiation of a lean NOx trap regeneration event, determining a current air-fuel ratio and comparing the current air-fuel ratio to a lean limit air-fuel ratio;

delaying the transition from lean stratified engine operation to rich homogeneous engine operation until the current air-fuel ratio reaches the lean limit air-fuel ratio; and

initiating transition from lean stratified engine operation to rich homogeneous engine operation when the current air-fuel ratio reaches the lean limit air-fuel ratio.

2. The method of claim 1, further comprising:

disabling an air-fuel feedback control for a period of time following the transition into and out of the lean NOx trap regeneration event.

3. The method of claim 2, wherein the period of time for disabling the air-fuel feedback control comprises a pre-calibrated period of time.

4. The method of claim 2, wherein the period of time for disabling the air-fuel feedback control comprises an on-line estimated period of time.

5. The method of claim 1, further comprising:

disabling an air charge feedback control for a period of time following the transition into and out of a lean NOx trap regeneration event.

6. The method of claim 5, wherein the period of time for disabling the air charge feedback control comprises a pre-calibrated period of time.

7. The method of claim 5, wherein the period of time for disabling the air charge feedback control comprises an on-line estimated period of time.

8. The method of claim 1, further comprising:

adjusting a desired air charge mass following the transition into and out of the lean NOx trap regeneration event from an initial air charge mass value to a final air charge mass value over one of a pre-calibrated time interval and an on-line estimated time interval.

9. The method of claim 1, further comprising:

setting the desired exhaust gas recirculation mass to zero.

10. The method of claim 1, further comprising:

controlling engine torque based upon driver demand.

11. System for controlling a direct-injection gasoline engine during regeneration of a lean NOx trap disposed in an exhaust path of the

engine, the regeneration characterized by a transition from lean stratified engine operation to rich homogeneous engine operation, comprising:

means for determining a current air-fuel ratio and comparing the current air-fuel ratio to a lean limit air-fuel ratio upon initiation of a lean NOx trap regeneration event;

means for delaying the transition from lean stratified engine operation to rich homogeneous engine operation until the current air-fuel ratio reaches the lean limit air-fuel ratio; and

means for initiating transition from lean stratified engine operation to rich homogeneous engine operation when the current air-fuel ratio reaches the lean limit air-fuel ratio.

12. The system of claim 11, further comprising:

means for disabling an air-fuel feedback control for a period of time following the transition into and out of the lean NOx trap regeneration event.

13. The system of claim 12, wherein said period of time for disabling the air-fuel feedback control comprises a pre-calibrated period of time.

14. The system of claim 12, wherein said period of time for disabling the air-fuel feedback control comprises an on-line estimated period of time.

15. The system of claim 11, further comprising:

means for disabling an air charge feedback control for a period of time following the transition into and out of the lean NOx trap regeneration event.

16. The system of claim 15, wherein said period of time for disabling the air charge feedback control comprises a pre-calibrated period of time.

17. The system of claim 15, wherein said period of time for disabling the air charge feedback control comprises an on-line estimated period of time.

18. The system of claim 11, further comprising:

means for adjusting a desired air charge mass following the transition into and out of the lean NOx trap regeneration event from an initial air charge mass value to a final air charge mass value over one of a pre-calibrated time interval and an on-line estimated time interval.

19. The system of claim 11, further comprising:

means for setting a desired exhaust gas recirculation mass to zero.

20. The system of claim 11, further comprising:

means for controlling engine torque based upon driver demand.

21. Article of manufacture comprising a storage medium having a computer program encoded therein for effecting a method for controlling a direct-injection gasoline engine during regeneration of a lean NOx trap disposed in an exhaust path of the engine, the regeneration characterized by a transition from lean stratified engine operation to rich homogeneous engine operation, the program comprising:

code for comparing a current air-fuel ratio to a lean limit air-fuel ratio upon initiation of a lean NOx trap regeneration event;

code for delaying transition from lean stratified engine operation to rich homogeneous engine operation until the current air-fuel ratio reaches the lean limit air-fuel ratio; and

code for initiating transition from lean stratified engine operation to rich homogeneous engine operation when the current air-fuel ratio reaches the lean limit air-fuel ratio.

22. The article of claim 21, further comprising:

code for disabling an air-fuel feedback control for a period of time following the transition into and out of the lean NOx trap regeneration event.

23. The article of claim 22, wherein said period of time for disabling the air-fuel feedback control comprises a pre-calibrated period of time.

24. The article of claim 22, wherein said period of time for disabling the air-fuel feedback control comprises an on-line estimated period of time.

25. The article of claim 21, further comprising:

code for disabling an air charge feedback control for a period of time following the transition into and out of the lean NOx trap regeneration event.

26. The article of claim 25, wherein said period of time for disabling the air charge feedback control comprises a pre-calibrated period of time.

27. The article of claim 25, wherein said period of time for disabling the air charge feedback control comprises an on-line estimated period of time.

28. The article of claim 21, further comprising:

code for adjusting a desired air charge mass following transition into and out of the lean NOx trap regeneration event from an initial air charge mass to a final air charge mass value over one of a pre-calibrated time interval and an on-line estimated time interval.

29. The article of claim 21, further comprising:

code for setting a desired exhaust gas recirculation mass to zero.

30. The article of claim 21, further comprising:

code for controlling engine torque based upon driver demand.